Geospatial data for disaster risk reduction and response

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Outline

Integrating In-situ data for risk modelling

Ex-post applications of space data and in-situ data integration

Improving in-situ data availability

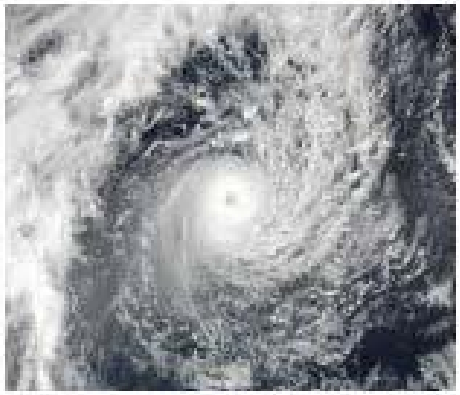
Remote Assessments

Conclusion

One of the main use of data for Disaster Risk Management

= Risk Modelling

ASSET LOSSES



Hazard

Exposure

Vulnerability

1. MODEL outputs

no calibration using in-situ data

or

2. MODEL outputs

calibration using in-situ data

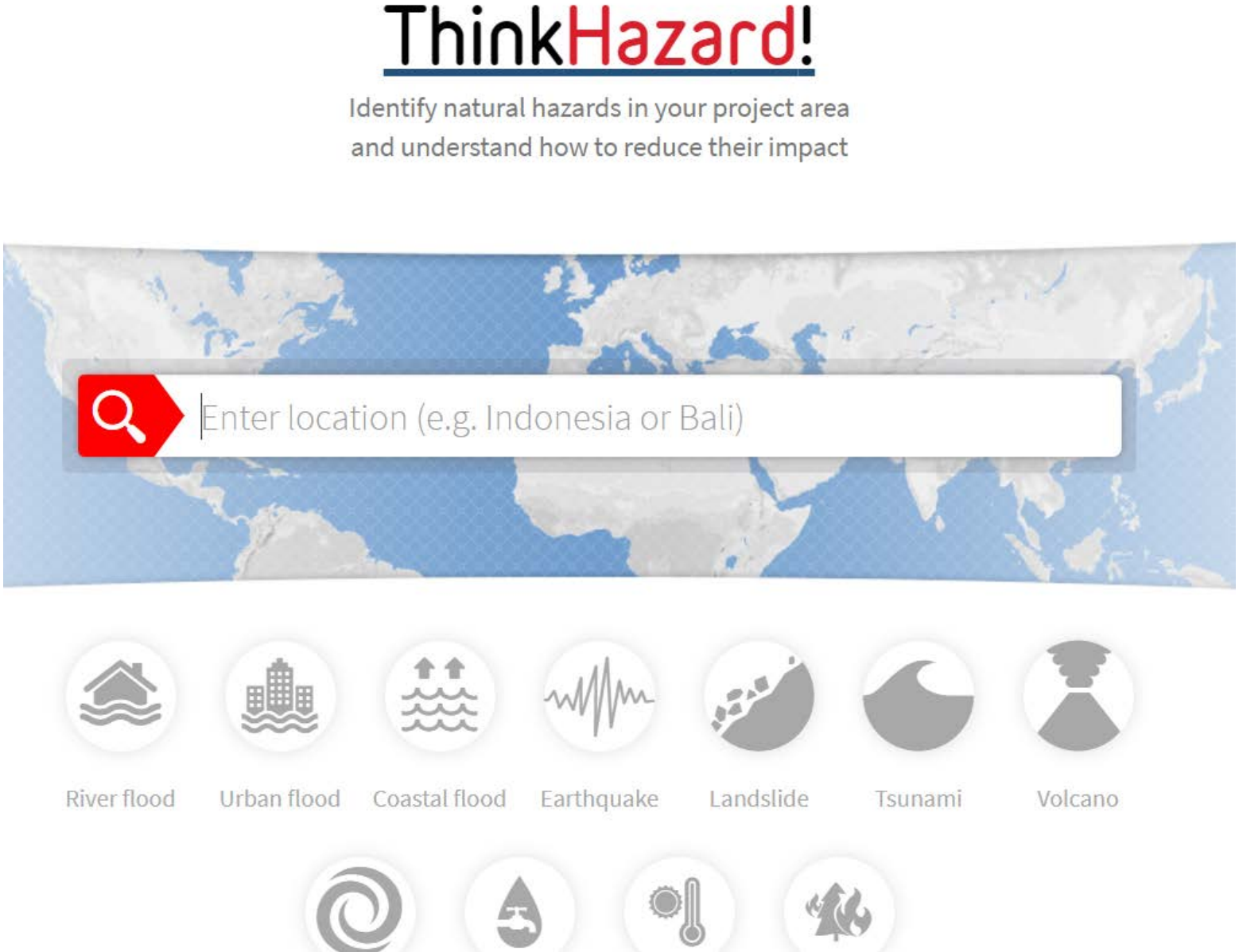
3. In-situ data only (more for ex-post applications)

Hazard modelling
Exposure modelling
Vulnerability modelling

Risk (final output, loss to assets estimated)

1. MODEL outputs

no calibration using in-situ data



1. MODEL outputs

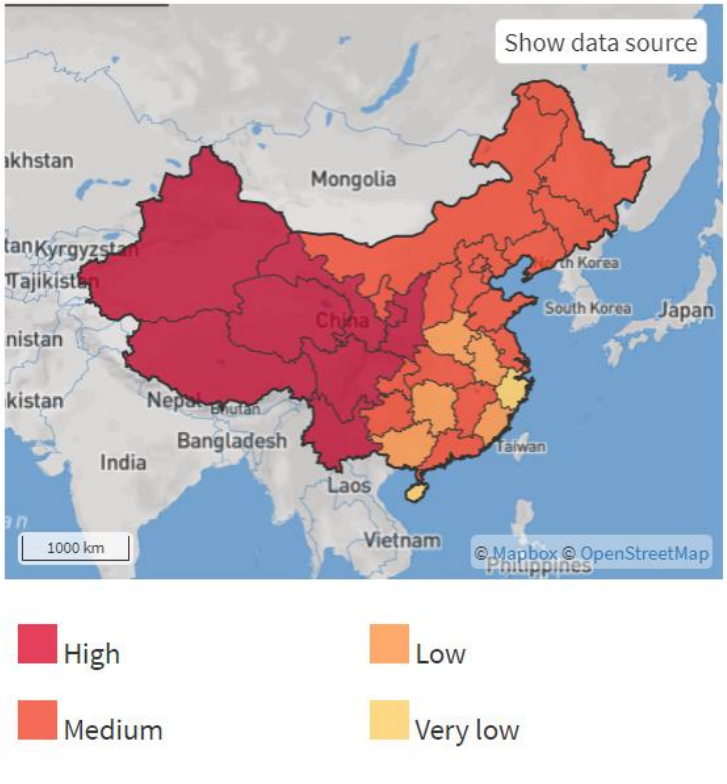
no calibration using in-situ data

China

Earthquake

Hazard level: ***High***

In the area you have selected (China) earthquake hazard is classified as **high** according to the information that is currently available. This means that there is more than a 20% chance of potentially-damaging earthquake shaking in your project area in the next 50 years. Based on this information, the impact of earthquake **must be considered** in all phases of the project, in particular during design and construction. **Project planning decisions, project design, and construction methods should take into account the level of earthquake hazard.** Further detailed information should be obtained to adequately account for the level of hazard.



Recommendations

- EARTHQUAKE HISTORY AND HAZARD: Get information about major earthquakes and secondary hazards (fires, landslides, liquefaction, tsunami in coastal areas) that have affected the project area in the past and the effects these caused. Community memory and historical accounts of earthquakes can provide useful information to supplement scientific studies. Contact the governmental organisations (e.g. Ministry of

2. MODEL outputs

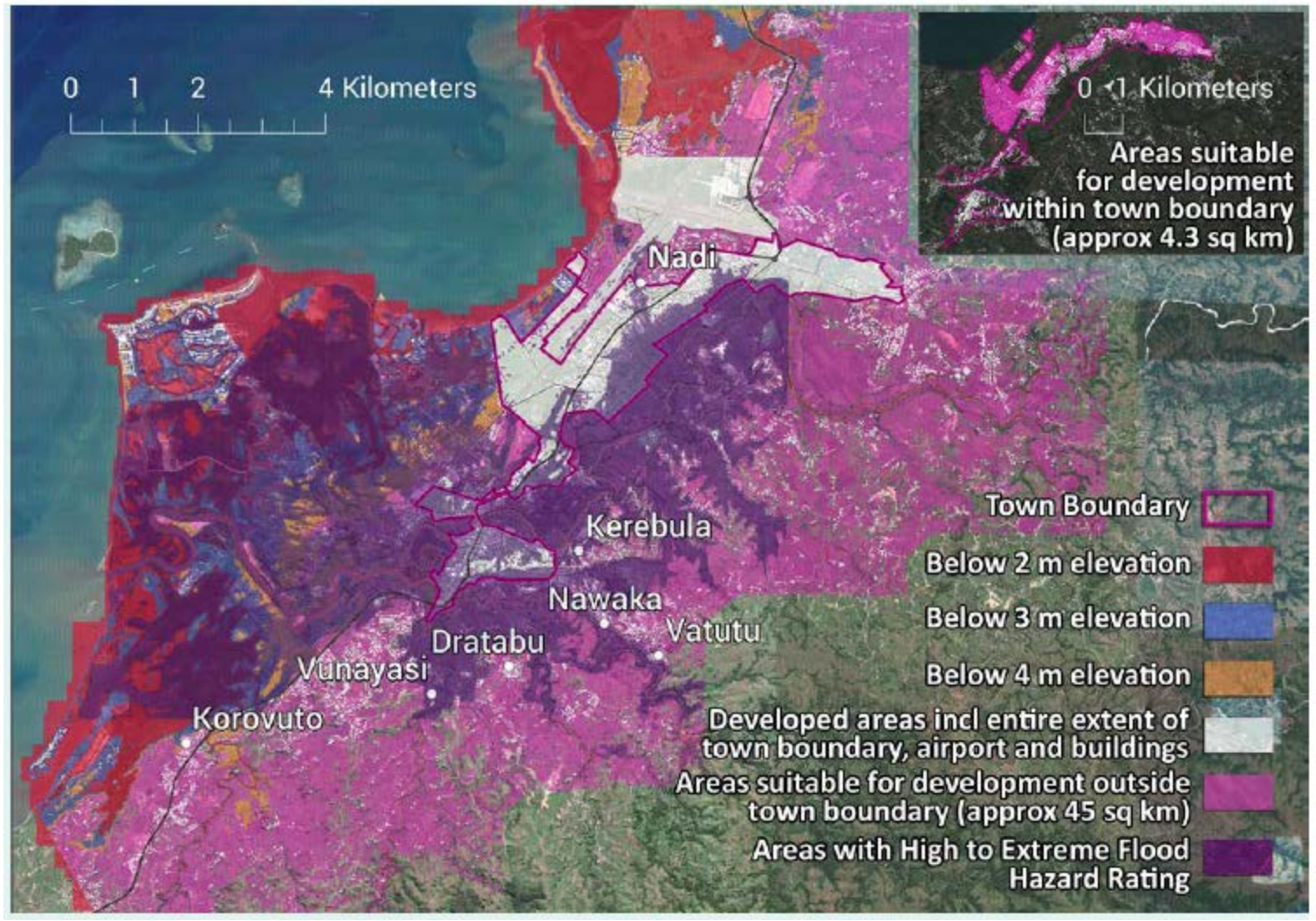
calibration using in-situ data (met office rain gauge, discharge data)

Fiji flood modelling example

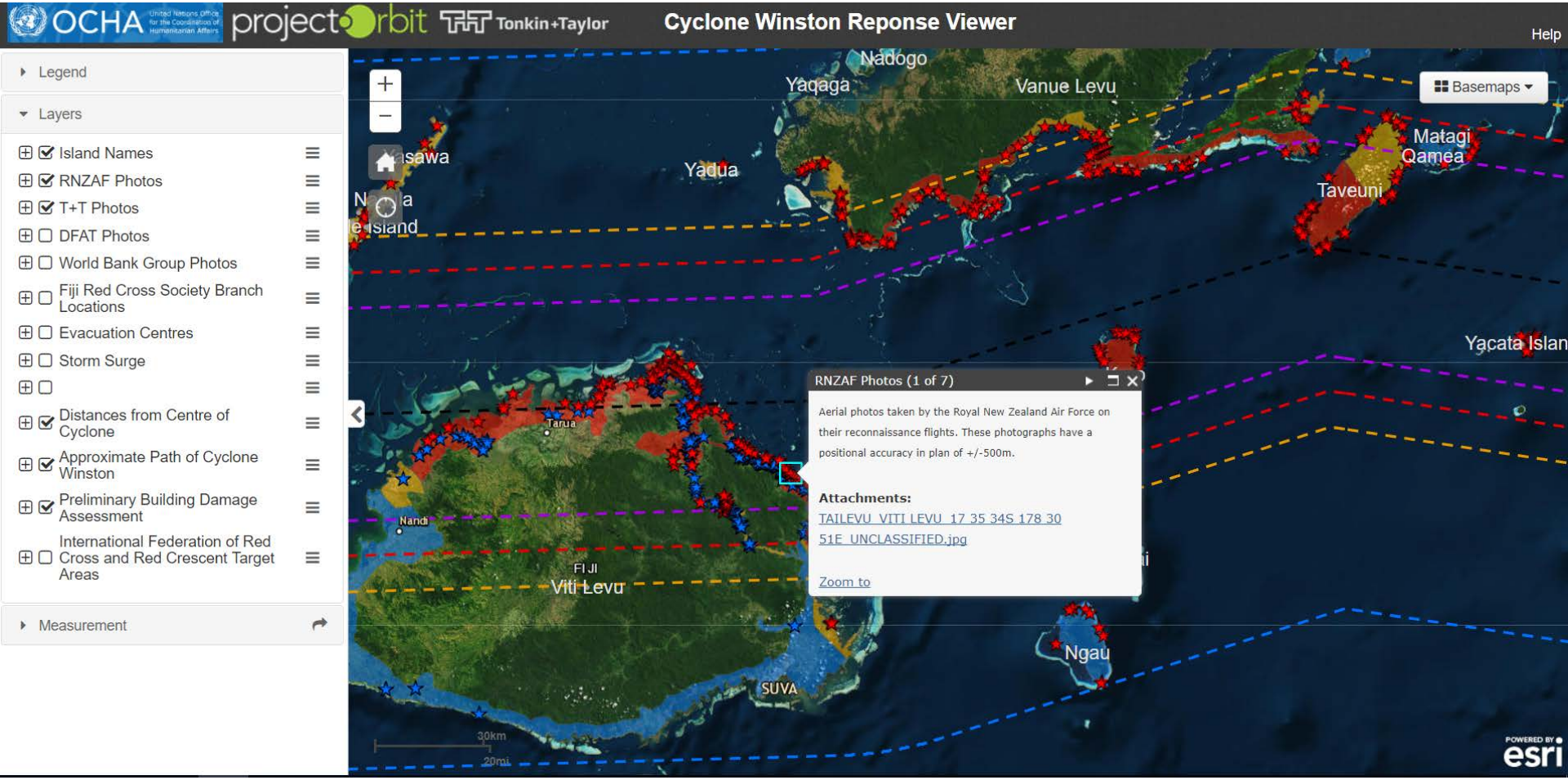
- **Global hazard models calibrated using local in-situ data allow high level assessment of risk**

- **Data sharing policy should be in place**

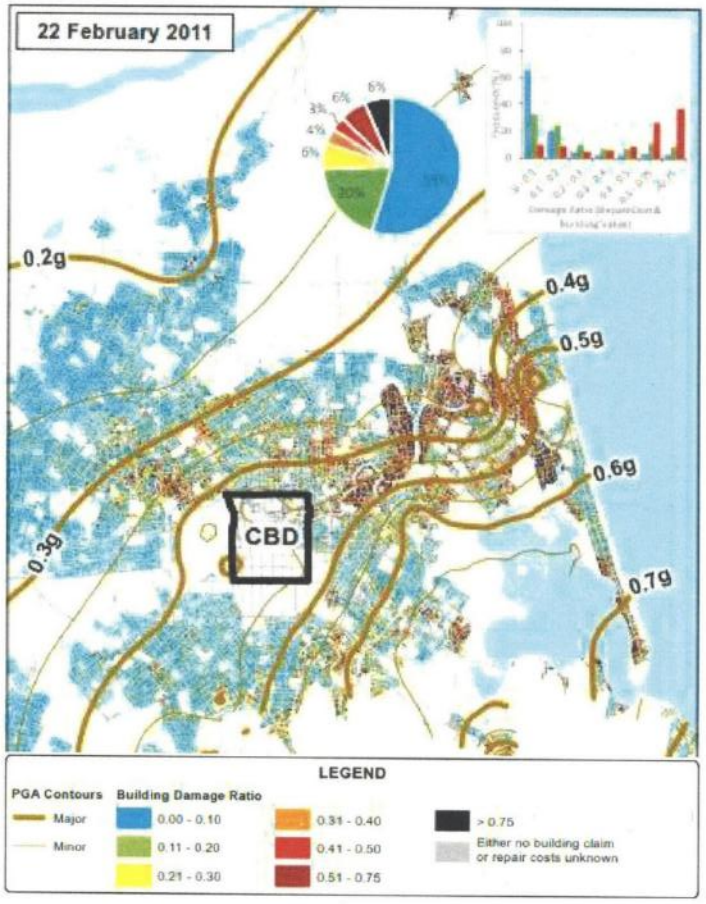
- **For detailed engineering level risk modelling, local in-situ data is necessary, especially topographic data (DEM)**

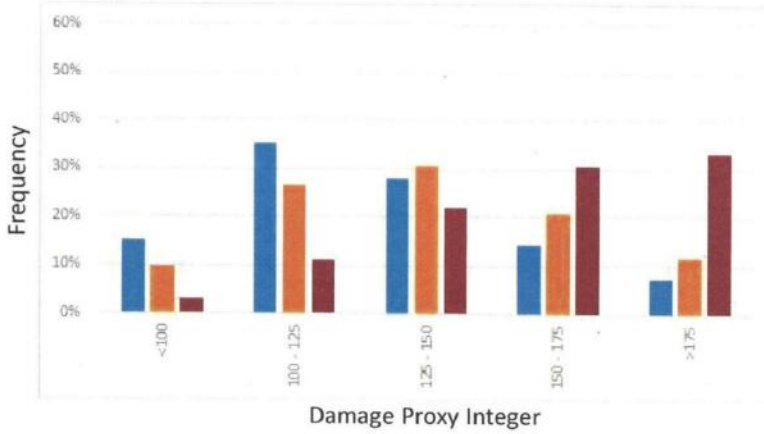

0 1 2 4 Kilometers
0 1 Kilometers
Areas suitable for development within town boundary (approx 4.3 sq km)
Nadi
Kerebula
Nawaka
Vatutu
Dratabu
Vunayasi
Korovuto
Town Boundary
Below 2 m elevation
Below 3 m elevation
Below 4 m elevation
Developed areas incl entire extent of town boundary, airport and buildings
Areas suitable for development outside town boundary (approx 45 sq km)
Areas with High to Extreme Flood Hazard Rating

Ex-post applications of space data and in-situ data integration


OCHA
projectorbit
Tonkin+Taylor
Cyclone Winston Reponse Viewer
Help
Legend
Layers
Island Names
RNZAF Photos
T+T Photos
DFAT Photos
World Bank Group Photos
Fiji Red Cross Society Branch Locations
Evacuation Centres
Storm Surge
Distances from Centre of Cyclone
Approximate Path of Cyclone Winston
Preliminary Building Damage Assessment
International Federation of Red Cross and Red Crescent Target Areas
Measurement
Basemaps
Nadogo
Yaqaga
Vanue Levu
Matagi
Qamea
Taveuni
Yadua
Yacata Islan
RNZAF Photos (1 of 7)
Aerial photos taken by the Royal New Zealand Air Force on their reconnaissance flights. These photographs have a positional accuracy in plan of +/-500m.
Attachments:
TAILEVU_VITI LEVU_17 35 34S 178 30 51E_UNCLASSIFIED.jpg
Zoom to
Tarua
Nandi
FIJI
Viti Levu
SUVA
Ngau
30km
20mi
POWERED BY esri

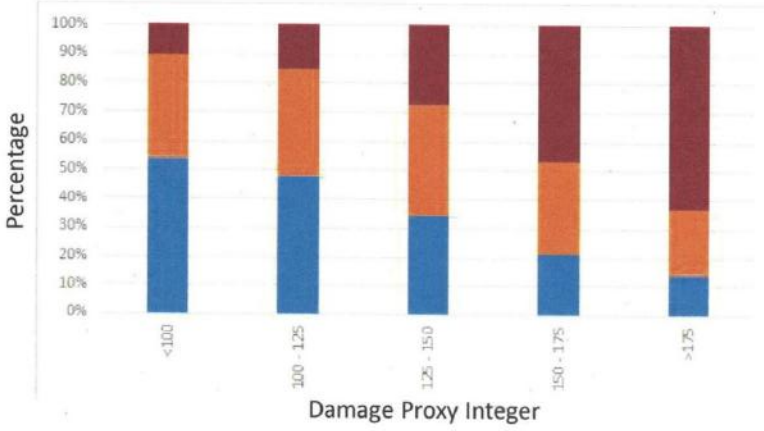
Correlation of the satellite radar sensor data with Building Damage Ratios (BDR) for the 22 February 2011 earthquake





Note: All bars for each BDR band sum to 100% (i.e. all the blue bars sum to 100%)

Blue = BDR < 0.2
Orange = 0.2 < BDR < 0.5
Red = BDR > 0.5



Note: The percentages of each BDR band, for a given damage proxy integer interval, have been calculated from the frequency histogram above by using the percentage value for each BDR band by the sum of the percentage values from the three bars for the different BDR bands for the respective damage proxy integer interval

Used UAV imagery to confirm the wind speed boundaries from model

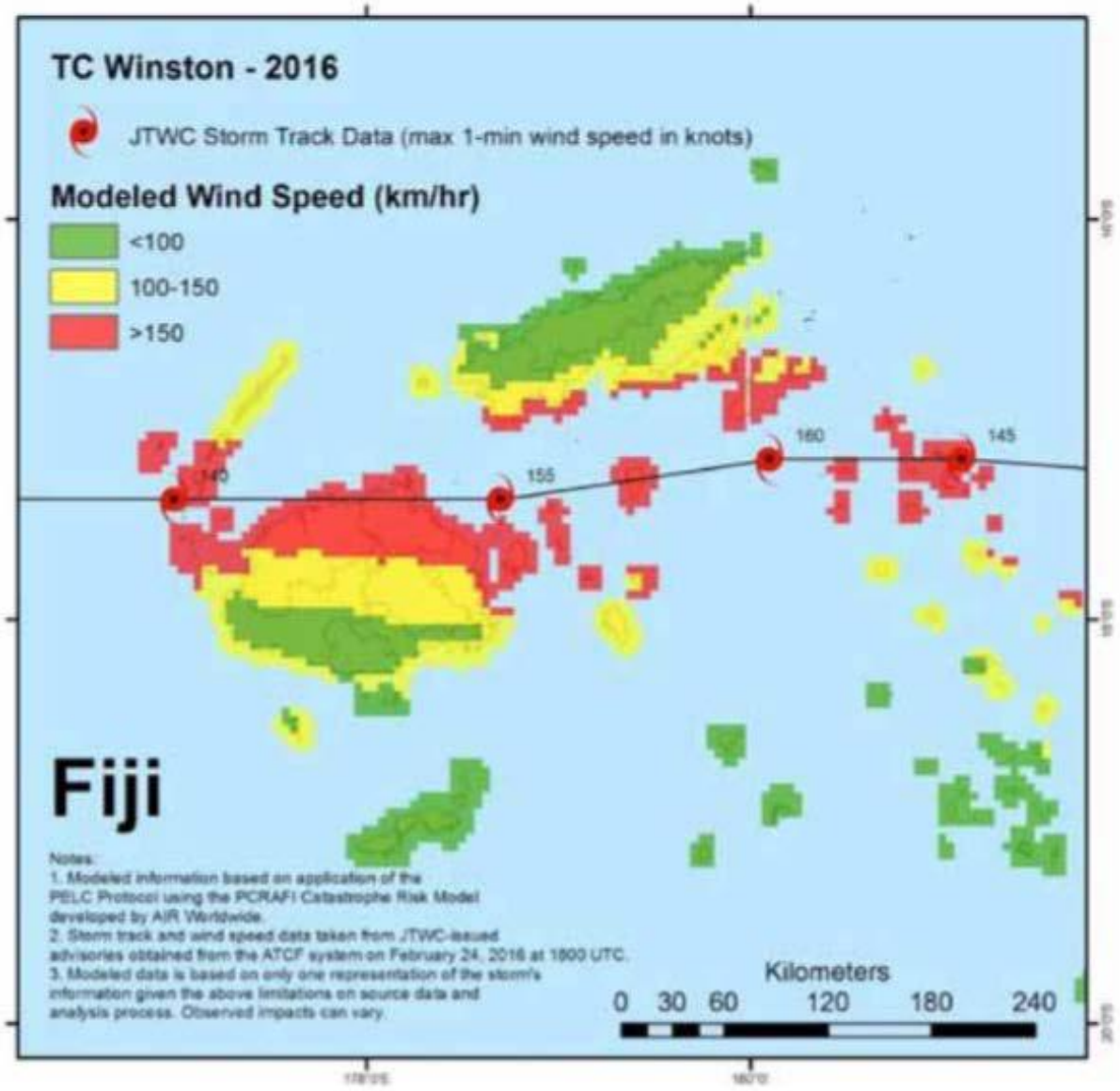


Figure 8: Modelled Maximum Wind Speed from TC Winston over Fiji

Source: Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) event brief, March 2016.

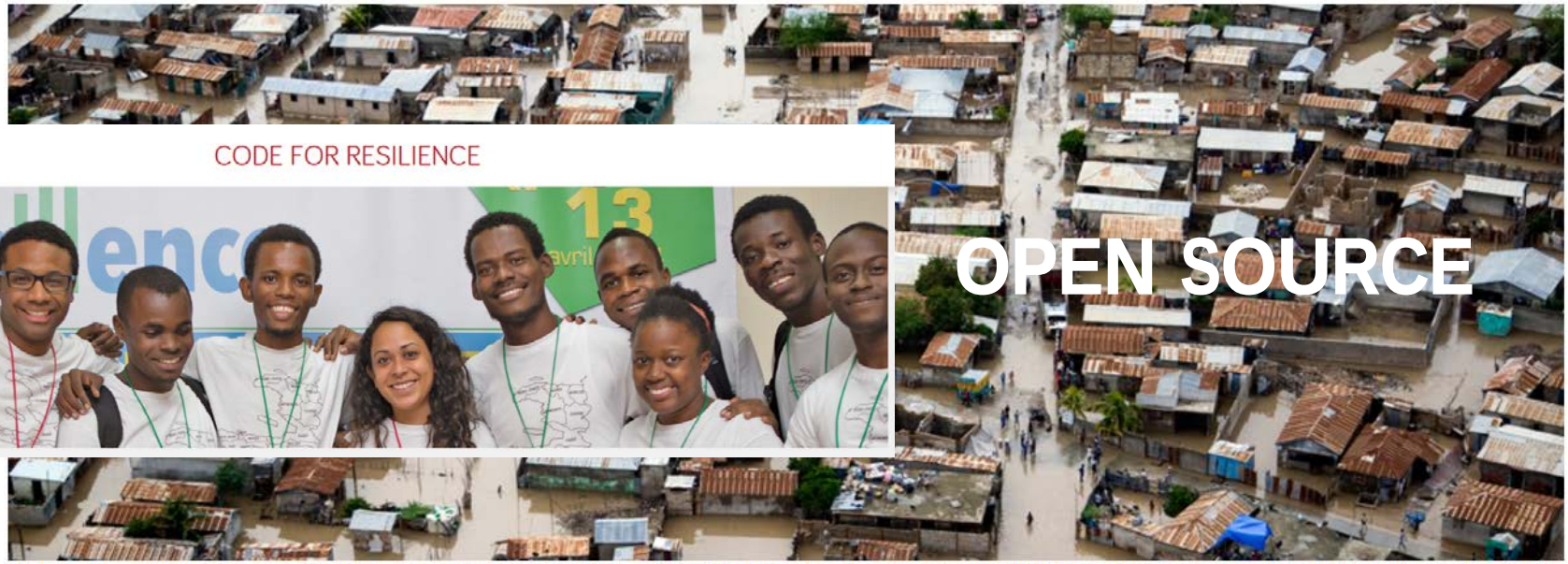
Improving in-situ data availability

Improving hydromet stations

GFDRR
Global Facility for Disaster Reduction and Recovery

WHO WE ARE | HOW WE WORK | WHERE WE WORK | PUBLICATIONS | WHAT'S NEW

Reducing Disaster Risk through Hydromet Technology in Haiti



CODE FOR RESILIENCE

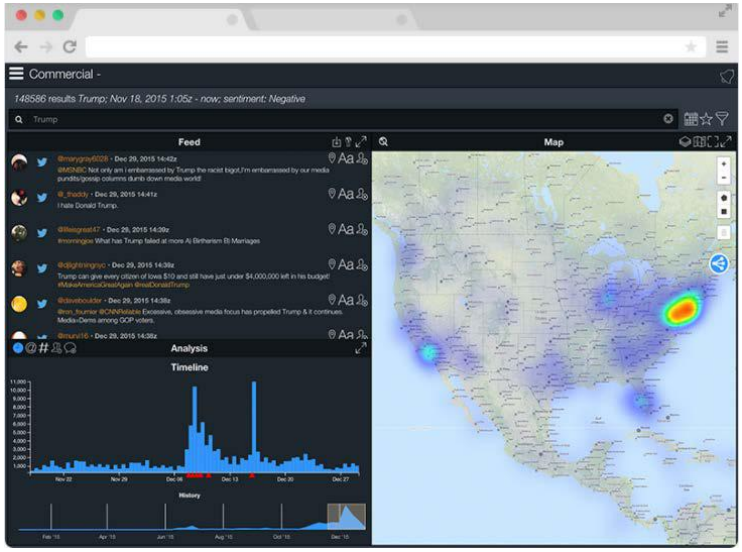
OPEN SOURCE

Hydro-meteorological hazards (tropical cyclones, thunderstorms, hailstorms, tornados, floods and drought) have a significant impact in Haiti's development. More than 96% of the country's territory is at risk from these hazards. The country's economy is heavily dependent on the agricultural sector, which produces more than 25% of the national GDP and is the main source of revenue for rural households. However, only 1% of farmers use irrigation, and understanding rainfall is crucial for the vast majority of farmers to grow crops used as their primary source of food and income.

Establishing and maintaining Vertical Reference frame in Tonga

Sometimes, only remote assessment is possible

Syria Damage and Needs Assessment



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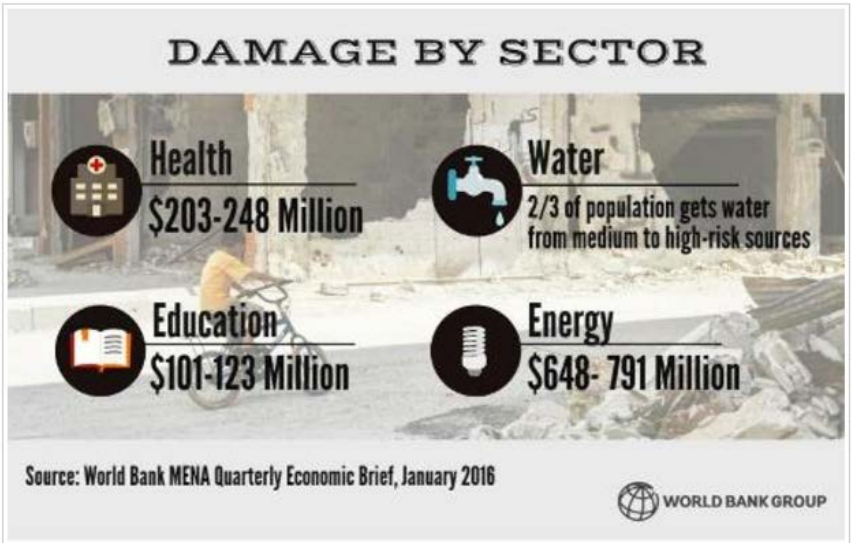

Information from Social media and other news outlets were combined with analysis of high-resolution satellite images + sector specialist knowledge to generate the full picture of the baseline + impact from the war

Conclusions

Availability of in-situ data helps calibrate global models

Data sharing policy must be in place

New technology and tools becoming available for in-situ data collection

Use of Space technology for SDG monitoring

FEATURE STORY | AUGUST 23, 2017

Using Satellites to Monitor Progress toward the SDGs